

## **REMARKS/ARGUMENTS**

Claims 1-3 and 34 are pending herein. Claims 5, 16 and 18 have been cancelled without prejudice or disclaimer. Claims 7 and 8 have been cancelled in favor of rewritten claim 1. Claim 6 has been cancelled, and the features of claim 6 are presented in independent form as new claim 34. Claims 2 and 3 have been rewritten to correct matters of form and clarification purposes only. Applicants respectfully submit that no new matter has been added.

The amendments made herein are further to the Amendment After Final Rejection that was originally filed on June 14, 2006, the entry of which is requested in the RCE Transmittal filed contemporaneously herewith.

1. Applicants appreciate the PTO indicating that claim 6 would be allowed if rewritten to overcome the objection discussed below. Applicants respectfully submit that claim 6 has been cancelled and the features of claim 6 are now recited in independent form in new claim 34. For at least the foregoing reasons, Applicants respectfully submit that at least new claim 34 is in condition for allowance. In addition to new claim 34, Applicants respectfully submit that claims 1-3 are also in condition for allowance for at least the reasons explains below, and respectfully request that the PTO issue a Notice of Allowance for this application in due course.

2. The objection to claims 5, 6, 8, 18 and 33 are noted, but deemed moot in view of the cancellation of those claims. Accordingly, Applicants respectfully request that the above rejection be reconsidered and withdrawn.

3. Claims 1-3, 5, 7, 8, 16, 18 and 33 were rejected under §103(a) over Nishi in view of JP '077. Applicants respectfully submit that this rejection is moot with respect to claims 5, 7, 8, 16, 18 and 33 in view of the cancellation of those claims. Accordingly, Applicants respectfully traverse this rejection with respect to claims 1-3.

Rewritten independent claim 1 now recites an electrochemical cell comprising a laminated sintered body having a helium leakage rate of  $10^{-6}$  Pa·m<sup>3</sup>/s or lower. The laminated sintered body includes a ceramic substrate comprising a ceramic porous body which has a thickness of 300  $\mu$ m or larger and which is one of an anode and a cathode. The ceramic porous body comprises a material selected from the group consisting of a lanthanum-containing perovskite-type complex oxide, platinum-zirconia cermet, palladium-zirconia cermet, ruthenium-zirconia cermet, nickel-zirconia cermet, platinum-cerium oxide cermet, palladium-cerium oxide cermet, ruthenium-cerium oxide cermet and nickel-cerium oxide cermet. The laminated sintered body also includes a ceramic dense body having a thickness of 25  $\mu$ m or smaller and which comprises a material selected from the group consisting of yttria-stabilized zirconia, yttria partially-stabilized zirconia and cerium oxide. The electrochemical cell also includes an electrode layer, which is the other one of an anode and a cathode, provided on the ceramic dense body of the laminated sintered body. The electrode layer comprises a material selected from the group consisting of a lanthanum-containing perovskite-type complex oxide, platinum-zirconia cermet, palladium-zirconia cermet, ruthenium-zirconia cermet, nickel-zirconia cermet, platinum-cerium oxide cermet, palladium-cerium oxide cermet, ruthenium-cerium oxide cermet and nickel-cerium oxide cermet.

Claims 2 and 3 each depend directly from independent claim 1. Applicants respectfully submit that support for rewritten claims 1-3 can be found, for example, in paragraphs [0045], [0046] and [0084] of the substitute specification filed December 2, 2005 and in Figs. 3(a) and 3(b) of the present application, and that no new matter has been added.

In the Advisory Action, the PTO asserted that it would have been obvious to use the entire structure shown in Fig. 2 of JP '077, rather than just the YSZ film of JP '077, in Nishi's electrochemical cell. The reasons why it would not have been possible to merely substitute Nishi's YSZ film with that of JP '077 and why, in that case, one could not expect the YSZ film of JP '077 to exhibit the desired helium leakage rate,

are explained in the Remarks section of the Amendment After Final Rejection originally filed on June 14, 2006, the entry of which is again requested in the RCE Transmittal filed herewith. Applicants respectfully submit, however, that the PTO's new position is also incorrect in view of rewritten independent claim 1 and for at least the further reasons explained below.

That is, even if the references were combined in the manner asserted in the Advisory Action in an attempt to provide a structure having the helium leakage rate of the claimed laminated sintered body, the resultant structure would still lack the structural features and characteristics of the electrochemical cell recited in rewritten independent claim 1. Applicants respectfully submit that, at best, the  $\text{LaMnO}_3$  layer 5 of JP '077 would correspond to a ceramic porous body, the YSZ layer 1 would correspond to a ceramic dense body, and the Pt layer 3 that is provided on the  $\text{Si}_3\text{N}_4$  sintered substrate of JP '077 (before the YSZ layer 1 is formed thereon) would then necessarily correspond to a second electrode, although the sintered  $\text{Si}_3\text{N}_4$  substrate, not the  $\text{LaMnO}_3$  layer, would actually be the only structure that could possibly constitute a self-supporting ceramic substrate. This structure, even when used in Nishi's electrochemical cell as suggested by the PTO, still does not include or even suggest each and every feature of rewritten claim 1.

For example, the  $\text{LaMnO}_3$  layer 5 in JP '077 is not a ceramic substrate comprising a ceramic porous body having a thickness of 300  $\mu\text{m}$  or more. Applicants respectfully submit that one skilled in the art would have understood that, in order to provide the particular structure of JP '077 that exhibits a desirable helium leakage rate, a substantially pin hole-free YSZ layer is formed on a self-supporting  $\text{Si}_3\text{N}_4$  sintered substrate through a thin Pt layer, and that the  $\text{LaMnO}_3$  layer is then laminated on the YSZ layer. In the context of that structure, the  $\text{LaMnO}_3$  layer is clearly formed on a layered structure that is already and necessarily supported by the sintered  $\text{Si}_3\text{N}_4$  substrate, which is critical to providing the pin hole-free layer. Applicants respectfully submit that one skilled in the art would have readily recognized that the  $\text{LaMnO}_3$ ,

YSZ, Pt structure of JP '077 alone would not be considered to be self-supporting without the benefit (and essential presence) of the sintered  $\text{Si}_3\text{N}_4$  substrate.

Moreover, Applicants respectfully submit that there is no disclosure or suggestion in JP '077 that the  $\text{LaMnO}_3$  layer would or even could have a thickness of 300  $\mu\text{m}$  or more, and one skilled in the art would not have been motivated to modify the thickness of the  $\text{LaMnO}_3$  layer to achieve a thickness of 300  $\mu\text{m}$  or more. Instead, Applicants respectfully submit that one skilled in the art would have understood that there would have been no need to increase the thickness of the  $\text{LaMnO}_3$  layer of JP '077, because that layer is simply not a part of the structure that functions as a support member. Indeed, that support feature is already provided by the  $\text{Si}_3\text{N}_4$  sintered substrate, and any modifications to increase the mechanical strength would have been made to that  $\text{Si}_3\text{N}_4$  substrate, not the  $\text{LaMnO}_3$  electrode layer.

Further, Applicants respectfully submit that one skilled in the art would have also understood that increasing the thickness of the  $\text{LaMnO}_3$  layer would actually have been undesirable, and such skilled artisans would have expected poor results if the distance between the three-phase interface and the surface of the  $\text{LaMnO}_3$  layer were increased. For at least the foregoing reasons, Applicants respectfully submit that even if one were to broadly, albeit improperly, interpret the  $\text{LaMnO}_3$  layer of JP '077 to somehow constitute a ceramic substrate, that layer still would not have the claimed thickness.

In addition to the above, Applicants respectfully submit that the structure of JP '077 does not include a second electrode comprising the specific materials recited in rewritten independent claim 1. That is, as noted above, the Pt layer 3 necessarily functions as an electrode, in composition and position, in the structure of JP '077. Applicants respectfully submit that such a thin metal layer is specifically needed according to JP '077 in order to avoid the negative influence that any ceramic electrode materials would have on the ability to form a pin hole-free YSZ layer on the surface of the  $\text{Si}_3\text{N}_4$  substrate. For at least these reasons, Applicants respectfully submit that it would not have been possible, much less obvious, to replace the Pt

electrode of JP '077 with a ceramic or to modify the composition of the Pt electrode of JP '077 to instead have a ceramic composition, and yet be able to provide a pin hole-free YSZ layer having the desired helium leakage rate.

Moreover, Applicants respectfully submit that the substrate 11 in Nishi is not an anode or a cathode, as claimed, but is merely a porous support body. Applicants respectfully submit that Nishi's structure clearly includes separate anode, cathode and electrolyte layers that are individually provided on the support substrate 11, and that Nishi does not disclose or suggest that the substrate 11 is or could even possibly be used as an anode or a cathode instead of the separate structures taught therein. Applicants respectfully submit that the actual electrode layers in Nishi and JP '077 simply could not be used as self-supporting substrates, and the actual substrates are not electrodes having the claimed ceramic compositions.

For at least the foregoing reasons, Applicants respectfully submit that rewritten independent claim 1, and claims 2 and 3 depending therefrom, define patentable subject matter over the applied references. Accordingly, Applicants respectfully request that the above rejection be reconsidered and withdrawn.

If the Examiner believes that contact with Applicants' attorney would be advantageous toward the disposition of this case, the Examiner is herein requested to call Applicants' attorney at the phone number noted below.

The Commissioner is hereby authorized to charge any additional fees associated with this communication or credit any overpayment to Deposit Account No. 50-1446.

Respectfully submitted,

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Date



Stephen P. Burr  
Reg. No. 32,970

Nicole J. Buckner  
Reg. No. 51, 508

SPB/NB/gmh

BURR & BROWN  
P.O. Box 7068  
Syracuse, NY 13261-7068

Customer No.: 025191  
Telephone: (315) 233-8300  
Facsimile: (315) 233-8320